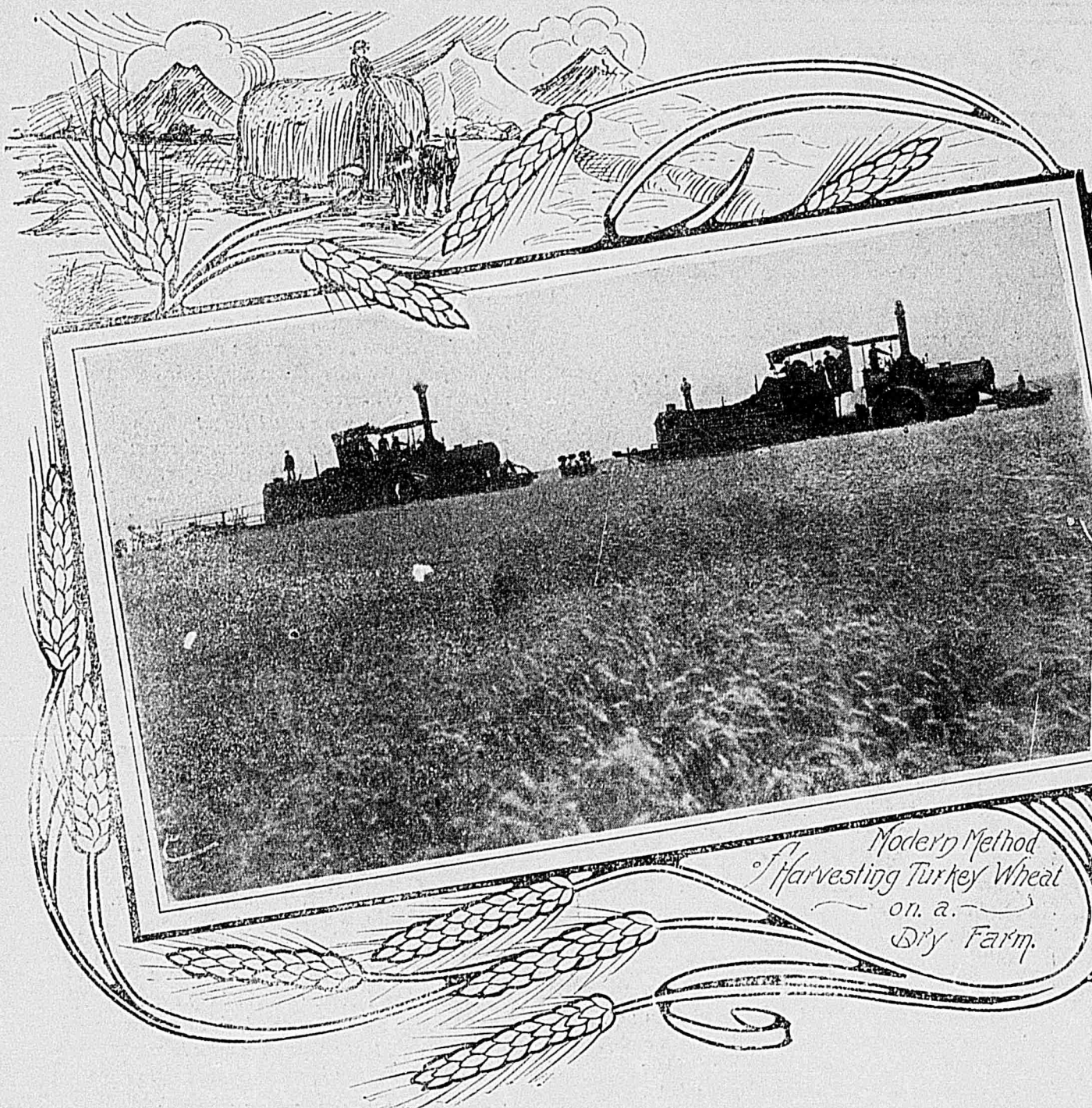


# The Utah Dry Farmer Laughs at the Drought



Dry Farming in the West has been developed by the application of Scientific Methods

Stock Turkey Red Wheat Showing Roots more than 7 ft. Long

Dry Farming Methods Applied to Orchard

LAST May and June and even in July there were a great many men in the farming districts of the state who were saying, "I told you so." March was dry; April drier and in June it was still dry. July gave no relief and during all of this time people who were opposed to the dry farming idea were bubbling over with joy. They were taking a great deal of "unction" to their souls and were continually sarcastically remarking, "You are surely getting enough of dry farming this year. We told you that when the dry year came dry farming would be shown to be a 'book farmer's' theory."

Lately we have not seen much of these men; they have been hiding their light under a bushel. Certainly the year was dry enough for even the most optimistic dry farmer; not since 1880 has there been such a dry year, yet notwithstanding that, excellent crops have been secured. From reliable sources we gather the information that in some sections the crops this year have been even better than last year on the dry lands.

Of course there were a great many failures; there always will be. All Utah farmers do not follow the proper methods and very few of them do as well as they know. A continuously cropped system resulted in disaster this year; poor plowing showed its effect to a greater extent than ever before; using too much seed resulted in "burnt" crops. All of these things have their effect and it would be folly to say that the gross returns of this year are as good as those of a year ago; but the farmer who did it right succeeded beyond his expectations and now the farmers of Utah are justified in feeling that dry farming has been established on a permanent basis.

One of the striking exhibits at the state fair was a stool of wheat grown on dry land. The stool was of the Turkey variety and had been taken out with its straw, roots and heads intact. We wonder if those who gazed upon this novelty realized that the painstaking labor of two men for more than three weeks was required in order to get this plant in the condition in which it was exhibited at the state fair, and more recently at the Irrigation exposition at Chicago.

## Deep and Fertile Soil

This plant showed roots extending down to a depth of nearly eight feet. It was taken from the dry land out on the Levan Ridge. This ridge is five miles in width and about 12 miles long. Only a few years ago it was covered with sagebrush but has now been converted in its entirety into blossoming wheat fields.

The soil, like most of Utah soils, is deep and fertile; the surface foot is dark colored clay loam, rich in humus; the succeeding foot is a friable red clay loam and this continues in the third and fourth feet but here the soil is mixed to a considerable extent with gypsum which is effective in preventing the rise of alkali. The fifth and sixth feet are more sandy but still red in clay; the seventh and eighth are apparently a mixture of red clay and sand underlain in the ninth and tenth feet by a blue clay, which has an exceptionally high water holding capacity. It was through just such soil as this that this root penetrated; there is no doubt at all but that they were going down into the soil to come in contact with the heavy blue clay, because in this material large quantities of water are held.

Dry farming crops are undoubtedly deep-rooted; where irrigation water is supplied it is unnecessary for the roots to go down into the soil and as a consequence they are spread out near the surface. In the case of dry farm crops however, if the rains do not come the plants make a strenuous effort to survive and reach out long distances for moisture and thus penetrate the soil to a great depth.

**Mystery Explained**  
The writer has visited dry farms a number of times with men who marveled that the crops were appearing green and luxuriant when there had been no rain for months and when the surface of the soil was entirely dry. The mystery is explained however, by the fact that the roots of these plants are not found near the surface but are going down in search of moisture many feet in the soil.

The roots that serve the purpose of holding the plant in place are found very largely in the surface foot. During the past season owing to the prolonged drouth these roots in many instances died and the plant was very easily toppled over, yet the leaves remained green and plump wheat was produced. This was due to the fact that the moisture and food supply came from great depths in the soil.

This habit of deep rooting in dry farm plants be-

comes an acquired characteristic and hence the folly of selecting seed grown under irrigation for the dry farm. For this reason a suggestion made by Dr. Wildsoe a number of years ago, to the effect that as the years go by larger crops will be grown with the same rain fall, is true. Our dry farm plants are becoming acclimated and varieties are being developed for use under arid conditions.

One of the surprising developments of the year in dry farming is the fact that it is not essential to have rain fall during spring months, as a great many people have heretofore believed that unless the rains came during the growing season of late spring and early summer the crop would not mature. This season, however, over practically the entire dry farming area of the state no precipitation came during these months at all and yet successful crops were harvested.

## Storing Precipitation

The theory long maintained that the soil serves as a storage reservoir is thus emphasized and it is possible, by the adoption of proper cultural methods, to store the precipitation of two and even three years in the soil for the use of the crop. However, the fact that good crops were produced during 1910 on very little rain fall does not mean that the crop matured on this rain fall at all, but it simply means that the excessive rain fall of 1909 assisted in bringing the 1910 crop to maturity. As evidence of this the failure of the crop on lands cropped during 1909

and on lands on which no attempt had been made to conserve the moisture, but reliance placed entirely upon the precipitation of the year, is ample evidence.

The officers of the experiment station have visited every dry farming section in the state during the year. They have been persistent in their studies of the causes of failure and reasons for success. These men have visited the numerous farms and have interviewed hundreds of dry farmers and as a result of their studies and investigations they have unanimously concluded that the adoption of proper cultural methods, the selection of approved drought resistant varieties of seed, and the use of a small amount of seed will produce profitable returns on the average dry farm even in the face of extreme drouth. We think it unnecessary here to cite individual cases because this was the universal experience and it is so generally recognized that scientific principles of dry farming must be rigidly observed if success is to be expected, that any argument is unnecessary.

The famous Cache valley farms yielded practically as good crops this year as ever before and the quality was the best known in years. It is rather an interesting thing in this connection to note that in the case of wheat production the best grain is grown on the least rain fall.

## Abundant Harvests

The farmers in Boxelder and Davis counties where dry farming has been longest successfully practised,

rejoiced this year in an abundant harvest. Out in southwest Salt Lake county the yields were in proportion to the amount of skill and knowledge used in producing the crop. The Juab valley did itself proud as was shown by the splendid exhibit at the recent state fair. From San Juan county comes the assurance of renewed faith in dry farming.

Forty acres of Turkey Red wheat on the experimental farm there gave an average yield of better than 25 bushels of wheat per acre. It should be remembered that in San Juan county there are millions of acres of land that will do this and this land today is practically untouched.

Among the factors responsible for the increased interest in dry farming this year was the passage of the enlarged homestead act introduced by Senator Smoot and the opening of thousands of acres of dry farm land. True, the call of "back to the farm" has affected a great many Utah citizens and many of the professional and business men of the state feel that land is a safe and profitable investment; it is probable too that the fact that there has been a waning interest in mining ventures is responsible for the diverting of some capital towards dry farming. Probably the most potent factor in this situation is the fact that the long looked for year of drouth, predicted by pessimists, arrived and successful crops were harvested. All of these factors taken together have resulted in stimulating a very great interest in this movement and the closing days of 1910 see hundreds of men from Utah villages and many from

the larger cities earnestly seeking locations on dry farm lands.

## Lands Being Snapped Up

It has been truly said that Uncle Sam will have but one crop of land and that this crop is rapidly being harvested. It is extremely gratifying in this connection to note the fact that Utah dry farm lands are being taken largely by Utah people. Here conditions for dry farming are ideal. In most of the other sections where dry farming is being practiced the farmer has come out from the east and placed his whole stake on the dry farm. He has had to make his home here and if failure came he would be financially ruined. In Utah the dry farms as a rule are adjacent to the little community where irrigation is practised. The irrigation farm yields forage crops, garden crops, fruit and the necessities of life. The dry farm is producing wheat, barley, oats and rye; if it fails the farmer has recourse to his irrigated land; if it succeeds it simply adds to his revenue. In this respect our conditions are very much superior to those in other sections and fortunately we have had no "boom" of dry farming lands.

As a rule those who have located on these lands have studied and sought advice from those who have experienced in this direction and by careful management it is felt that a great majority of those who have thus taken up land will succeed.

## Future

Only the eye of a prophet can foretell the possibilities of this industry. There are millions of acres of land in this state teeming with wealth and this can be brought to the doors of the careful and energetic husbandman. As the sagebrush disappears and the golden wheat fields come in, the bread stuff for a prosperous commonwealth can be produced here. On our irrigated lands expensive and profitable crops can be grown such as choice fruits, dairy products, poultry products, sugar beets, etc. These naturally belong to the realm of irrigation farming. The production of the bread stuffs belong to the land lying high above the irrigation canal.

These cheap lands can be profitably utilized and the future destiny of this state depends in a very large measure upon the ability displayed in subjugating these desert lands.

## The Past Year

On the experiment farm at Nephi one plot yielded 36.3 bushels of wheat per acre. This wheat is remarkably good quality; it is rich in gluten and consequently valuable for bread making. The Turkey wheat has become to Utah dry farmers what the Jonathan apple is to the Utah orchard. It is by far the best drouth-resistant wheat that we have, possessing the highest yielding power, deep roots and a greatest demand by the millers. The only objection offered to the wheat is that it is bearded but this objection is easily offset by its many excellencies.

Through The Christmas News the writer desires in the most emphatic manner, to emphasize the pre dominance from every standpoint of this wheat as the varieties generally grown in the dry farming districts. A number of farmers all over the state report yields much better than 30 bushels per acre on the dry lands and this is considered exceptional by good.

Spring grown crops did not this year succeed as well because of the drouth. One of the varieties of spring barley produced, however, on the experiment farm 16.4 bushels per acre, but the oats were practically a failure. One variety of potatoes yielded 3 bushels to the acre; and 98 per cent of these were marketable. These potatoes at 60c per bushel were producing more than \$30 per acre and this from land that only a few years ago was considered to be worth but \$1.25 per acre.

## In Conclusion

I am glad to know that there is a general recognition of the value of this dry farm movement. Those who are promoting its interests are supported by the people of the state; it is humanity's work in the broadest sense to take a barren, unproductive waste and transform it into a productive and fruitful field. It is a miracle which only the genius and industry of a splendid type of people can perform.

Much has been done in the past in the way of definite achievement as is evidenced by the happy homes and fertile fields in what were formerly barren, sagebrush deserts. Much yet remains to be accomplished because the beginning has only been made and the accomplishments of the past are only an index to the possibilities of the future.

LEWIS A. MERRILL

## Chiseling a Dinosaur From His Rocky Bed

WHILE searching the hills of the Green River district for fossils and mammals, previously extant in what is now the valley of that river, Prof. Earl Douglas, of the Carnegie Museum at Pittsburgh, Pa., came across a ledge of broken strata in which his eager eye espied some portions of the petrified skeleton of a dinosaur, or, terrible lizard, as the name implies. This was the largest animal that ever existed, and at the same time the most highly organized in structure. The species constituted many varieties, of which only two, the Brontosaurus and the Diplodocus, will be referred to here.

Prof. Douglas made the discovery on Aug. 17, 1909, and in 16 days was on the scene with three men furnished with the implements to begin the digging. Since then, Sept. 2, 1909, all the men have been continuously chiseling, but have not yet finished their task. Still they are chiseling, and still the dinosaur remains unfinished. Unfinished, though some 47 boxes, ranging in size from one and a half by three and a half by five or six, every one containing a portion of the monstrous skeleton, may be seen in one place at the foot of the hill, on the top of which is the deposit. Another similar heap of boxes, also bearing like measurements and burdens, may be found on the other side of the hill. Every box bears the address, "Dr. W. J. Holland, president of Carnegie Museum, Pittsburgh, Pa.," and every box is ready for shipment.

Of these boxes, however, a few contain parts of a second, somewhat smaller one, but which is of itself monstrous beyond conception. Prof. Douglas explains that just before completing, as he then thought (it is not yet completed) the work on the first, the Brontosaurus, some of the vertebrae of the second the Diplodocus, were discovered. Indeed, he says that the bones of both are so intermingled that even he loses trace of their individualities; and he often expresses a subdued belief that still others are distributed among them, so varied and numerous seem the pieces.

In his description of the skeleton, Prof. Douglas tells that the Brontosaurus measures between 75 and 80 feet in length, from head to tail (tip of each). It resembles, or the Diplodocus now on exhibition in the Carnegie Museum at Pittsburgh resembles, for all the world a monstrous serpent which was wont to "go upon its belly," according to the ecclesiastical curse, but which, at some stage of its existence developed miniature feet, then legs, and these evolved into what finally raised the center of the huge body to such a height as would admit the largest of existing land animals to pass upright beneath it.

The larger rib of this Brontosaurus measured 13 inches across the head and seven feet two inches in length. If then it was possessed of the sternal ribs as others of its kind are known to have been, and if these ribs bore the same proportions to the side ribs that the others have done, then its gigantic legs carried a body 10 feet in depth, or approximately 30

feet in circumference. The spinal ribs of this animal have not yet been found, but Prof. Douglas is hopefully watching every new exposure for them.

The vertebrae of the Dinosaur number about 95 in all, smallest at the neck, near the head, and at the tip of the tail, and increasing in size from these points to the body which is about in the middle, where they assume a diameter of many inches.

The body occupies considerably less than one-third of the total length of the animal. Of the remainder the tail forms the greater part. The enormous bones of the body seem rather to be the parts of a small machine than of an animal. One femur of the smaller animal, the Diplodocus, measures 19 inches across the head and is five and a half feet in length. It is still partly cemented to the stone, on the under side. This bone will weigh between 600 and 700 pounds, while the pelvis into which it fitted, measures three and a half feet across. The pelvis of the Brontosaurus was a foot larger still. The foot of the animal is said to have been three feet in length. The skeleton of the larger one taken from this deposit, according to Prof. Douglas' most reluctant estimate, weighed "several tons." He asserts, however, quite boldly, that the live weight of the animal was from 20 to 30 tons; and his estimate, he declares, is well within the range of safety.

The head of the Brontosaurus was not found. It was while following the neck vertebrae downward for the head that the chiselers found their implements among the bones of the Diplodocus. It is very difficult to distinguish between the remains of the two animals. Prof. Douglas cherishes a doubtful inclination to believe that even more than two individuals are mingled together in the deposit in which they are now working. The neck of the Diplodocus also runs downward. The professor en-



Man Chiseling Out Femur of the Baby Diplodocus.

tertains a faint hope that the head of this one may be discovered.

The digging of the fossil is necessarily slow and expensive. The bones lie in all directions and conditions, and must be chiseled out with intense care. Only short holes can be drilled at a time for fear of striking the parts. Very little blasting can be done; which necessitates the continuous scratching and scraping of the rocks with a hammer and a chisel. As soon as a portion has been disengaged it is well wrapped in burlap which has been saturated in plaster of Paris. This is wound about it until it is enveloped in a coat of almost malleable plaster. Often some bones can be only partly uncovered at a time. This is due to the fact that they run into depths or directions which, for the time being, must not be disturbed. In such cases it is often necessary to coat the exposed portions with plaster to prevent disintegration. A box is made on the scene to fit each bone; into this, as soon as possible, the part is packed. Prof. Douglas estimates the cost of digging at from three to four thousand dollars each.

The fossil now being dug by Prof. Douglas is embedded in soft sandstone, very near the top of the low hills along the river. It is estimated that at one time five or six miles of sediment formed a covering for this Dinosaur, and all his friends, during the prolonged sleep, which Prof. Douglas gives as not less than eight to ten million years. He declares that this estimate is conservative.

The fossils are in the Morrison deposit, of which some 800 feet lay above them. Above the Morrison came the Dakota. The depth of this stratum is not accurately known, but is thought to be at least 150 feet; above this the Mowery shales occupied a thickness of about a hundred feet; next came the Mancos for 6,000 to 7,000 feet; the Meca Verde, 2,500, the Wasatch 2,000, the Green River 2,000, the Bridger 2,000 and the Uintah from 3,000 to 5,000 feet. This latter deposit has not been measured through its entire depth, hence the wide margin in the approximates. Figuring with all the smallest estimates, which, according to Prof. Douglas, are all well within the realm of safety, 1,800 to 2,200 feet of sediment that collected over the graves of the Dinosaurs during the millions while the earth was increasing her age by ten million years. There is in this also some uncertainty for in one place in the region, near Dragon, the Uintah deposit overlies the Meca Verde, while in other parts of the district they are separated by 15,000 feet. This of course renders the determining of either age or original depth of the deposit containing the fossils problematical.

It is a trip of 40 miles from Vernal to the bed of the Dinosaurs and back. Eight of the teachers of the Vernal Central school spent a recent Saturday in making it, on the invitation of Prof. Douglas. They were Mrs. Kate Calder, Miss Dora Calder, Pearl Phillips, Hazel Ashton, Margaret Lee, Lorna Burton and Messrs. A. E. Johnson, Mencer Calder, and the writer.

JOHN E. BOYES.

Vernal, Oct. 19, 1910.